Space Weather Forecast

Issued on Monday, 03 July 2023 at 01:15 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor/Moderate R1/R2 Radio Blackouts likely. Chance of S1/Minor radiation storm on 03 July. Slight chance of Minor Geomagnetic Storm 04 Jul.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been High with an X1 flare peaking at 02/2314 UTC from a large region in the northwest. This remains the largest and most complex region on the visible disc. The region has grown slightly through the period, and is retaining some magnetic complexity. Two regions close together in the southeast have both either grown slightly, or revealed additional spots as they become more clearly visible. Both are showing signs of trying to develop some magnetic complexity, although neither has a clear signature at the present time. The remaining regions on the disc are relatively small and stable at this time.
Two Moderate-class flares from the southeast at 01/2223 UTC and 02/0235 UTC appear to have resulted in separate, slow Coronal Mass Ejections (CMEs). These have been assessed as missing behind Earth in its orbit. We await coronagraph imagery to see if the X-flare has produced a CME.

Solar Wind / Geomagnetic Activity: The solar wind parameters indicate a waning weak coronal hole fast wind. The wind speed was mostly at slightly elevated levels between 400-500 km/s, but with a slight declining trend. The Interplanetary Magnetic Field was weak throughout, while the north-south component varied weakly. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary
Solar Activity: Low to Moderate activity is likely, with a slight chance of further Strong flares. The risk is mostly coming from the large sunspot in the northwest, but potentially also from the smaller sunspots in the southeast.

Solar Wind / Geomagnetic Activity: A CME associated with a Moderate-class flare on 29 Jun may include an Earth-directed component. Any glancing arrival at Earth would be expected on 04 July, but it is considered more likely to miss. Current slightly elevated solar winds from a coronal hole fast wind are slowly declining and should become slow during 03 July. Any connection to a further small coronal hole is expected to be weak. Wind speeds are expected to be slow or slightly elevated throughout.
Geomagnetic activity is expected to be mostly Quiet, with only a slight chance of Active or G1/Minor Storm conditions on 04 July should we see any weak fast wind or possible glancing CME impact.

Energetic Particles / Solar Radiation: The solar radiation has a chance of reaching the S1/Minor Storm threshold on 03 July due to the recent Strong flare. Should this event not give a radiation storm, then there is a slight chance of S1/Minor storm levels being reached through the rest of the period.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	10	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	50	40
Very Active	R3 to R5 X	Yes	15	15	10	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	40	10	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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